

DESCRIPTION OF THE LARVA OF *PHALAENOPHANA*
EXTREMALIS WITH NOTES ON *P. PYRAMUSALIS*
(NOCTUIDAE)

GEORGE L. GODFREY

Section of Faunistic Surveys and Insect Identification, Illinois Natural History
Survey, 172 Natural Resources Building, Champaign, Illinois 61820

ABSTRACT. The mature larva of *Phalaenophana extremalis* (Barnes & McDunnough) (Noctuidae) is described and illustrated. The phylogenetic relationships of *P. extremalis* and *P. pyramusalis* (Walker) are discussed.

The noctuid genus *Phalaenophana* Grote (Herminiinae) is a small taxon containing but two North American species (McDunnough, 1938) and two in South America (Forbes, 1954). The Nearctic species are *P. pyramusalis* (Walker) and *P. extremalis* (Barnes & McDunnough). Walker (1859) simply listed the type-locality of the former species as "United States," and Grote (1873) described the same species under *rurigena* from Hastings, New York and Pennsylvania. Later authors have described the distribution for *P. pyramusalis* to include the area extending from Nova Scotia to Florida and westward to Saskatchewan and Texas (Forbes, 1954; Kimball, 1965). The mature larva of *P. pyramusalis* was described from Tennessee specimens that fed on "... forest leaves black with decay" (Crumb, 1934, 1956). Forbes (1954) listed its larval food as wilted and dry leaves. The type-locality of the moth of *P. extremalis* is the "White Mts., Ariz." (Barnes & McDunnough, 1912). Other known collecting localities for this species are the Huachuca Mountains, Arizona and Beulah, New Mexico (unpublished records, United States National Museum of Natural History (USNMNH)). The larva of *P. extremalis* is unknown.

This paper describes the mature larvae of *P. extremalis* reared from the Chiricahua Mountains, Cochise Co., Arizona, and comments on its phylogenetic status. All techniques, morphological terminology, and abbreviations used in this study were reported previously (Godfrey, 1972). The specimens examined are from the collection of John G. Franclemont.

Phalaenophana extremalis (Barnes & McDunnough)

General. Head width 1.28-1.40 mm. Total head and body length 12.7-13.3 mm (inflated) (one uninflated, recently moulted specimen measured 9.2 mm). Metathoracic coxae contiguous to narrowly separated. Prolegs present on Ab3-6, 10, size increasing caudad on Ab3-6, those on Ab3 about ½ size of those on Ab6 (Fig. 1). Crochets homoideous, uniordinal. Integument of head and body granulated. Head granules at 100× small, beaded. Body granules at 100× heterogeneous (except on cervical shield as noted below), conical, bearing minute ridges that converge distad, some granules quite coarse. Dorsal setae on Ab1-8 (Fig. 8) arising from conspicuous, broad based, conical



FIGS. 1-6. *Phalaenophana extremalis* larva: 1, lateral habitus; 2, frontal view of head; 3, lateral view of hypopharyngeal complex; 4, oral aspect of left mandible; 5, left dorsolateral setal arrangement of prothorax; 6, left dorsolateral setal arrangement of mesothorax. Scale lines = 0.5 mm except as noted.

tubercles; setae D1 projecting cephalad, D2 caudad; setae with blunt tips, distal $\frac{1}{3}$ of setae appearing slightly constricted. Spiracles weakly emarginate.

Head (Fig. 2). Postgenal sutures slightly sigmoid but not converging distad. Length of epicranial suture 0.54–0.62 mm. Height of frons 0.42–0.50 mm. Distance from F1 to anterior edge of clypeus 0.13–0.16 mm. Interspace F1–F1 0.24 mm. AF2 posterior of frons apex. Setae A1–3 forming obtuse angle at A2. Interspace P1–P1 slightly less than subequal to P2–P2. Distance from P1 to epicranial suture about $\frac{1}{2}$ P1–L. Transverse line through P1 passing posterior of juncture of adfrontal ecdysial line and on or slightly posterior of L setae. Setae AF2, L, P1–2 blunt distally. Remaining head setae tapering distad. P2 setigerous tubercle, when viewed laterally, slightly raised and projecting cephalad. Ocellar spacing: Oc1–Oc2 0.05–0.06 mm, Oc2–Oc3 0.04–0.05 mm, Oc3–Oc4 0.03 mm.

Mouthparts. Hypopharyngeal complex (Fig. 3): spinneret tapering distad; stipular seta about $\frac{1}{2}$ Lps1, subequal to Lp1; Lp1 greater than Lps2; slightly less than Lp2; tip of Lp2 approximating distal lip of spinneret; distal $\frac{1}{4}$ of hypopharynx above spinneret barren of spines, remainder of distal and proximolateral regions clothed with numerous, short, thin spines. Mandible (Fig. 4): lateral surface bearing two setae; inner surface with two ridges not extending to tips of outer teeth; outer teeth 1–4 triangular, the 4th rather low and reduced.

Thorax. Segment T1 (Fig. 5): cervical shield distinctly sclerotized, covered with small, homogeneously-sized, beaded granules similar to those on head; distinct transverse depression between XD and D tubercles; depression behind D2 tubercles extends ventrad then curves cephalad before terminating anterior of SD tubercles; shield includes SD tubercles; SD1 and L2 setigerous tubercles visible at 100 \times but their setae are absent; all setae except V's and those on legs bluntly tipped. Tubercles of SV setae contiguous to narrowly separated. Spiracle transversely aligned with posterior margin of cervical shield. Segments T2–3 (Fig. 6): SD1 thin, hairlike; setae D–SV bluntly tipped. Tarsal setae (Fig. 7): Ts1 slightly lanceolate; Ts2 narrow, tapering distad; Ts3 spatulate; Ts4 narrow, tapering distad.

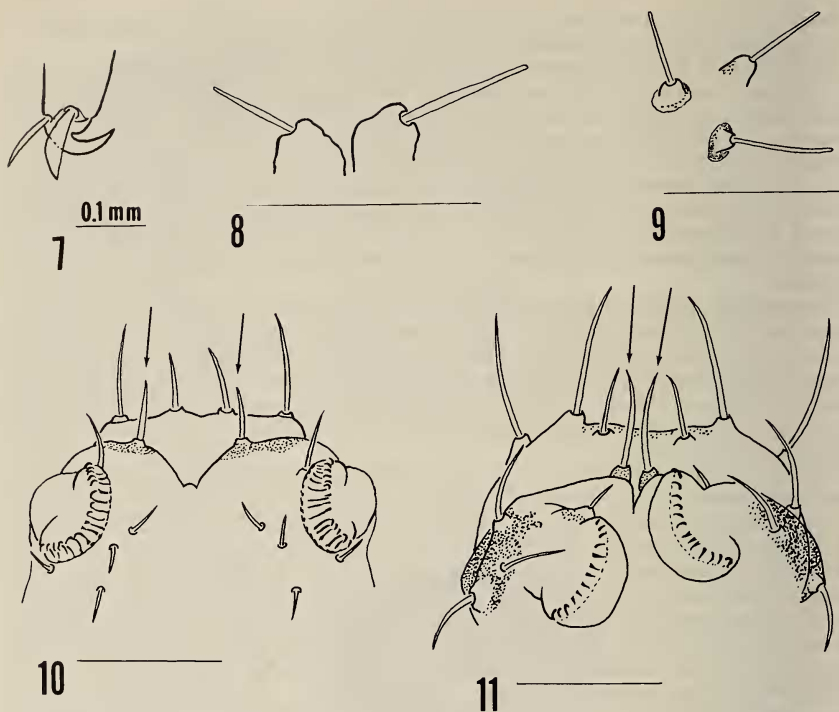
Abdomen. Ab1–6 with 3 SV setae, Ab7–9 with 1 each. Ab1–6 lateral chaetotaxy as shown in Fig. 1. Ab9: D1 and SD1 setae subequal; tubercles D1 and SD1 separated from each other (Fig. 9). Subanal setae on Ab10 widely spaced (Fig. 10). Length of D1's on Ab6–7 0.19–0.24 mm, D2's 0.24–0.28 mm. Height of Asp7 0.08–0.09 mm, Asp8 0.12–0.16 mm.

Coloration (preserved material). Head with dark brown coronal stripes and reticulation (Fig. 2). Body pale with contrasting, broad, brown middorsal stripe extending from T2 through Ab10, especially intensified on anterior half of each segment. Mid-dorsal line on cervical shield pale. Tubercles, thoracic legs, and lateral shields of prolegs dark brown. Ab1–6 with brown oblique stripes starting in front of spiracle and extending dorsocephalad (Fig. 1), dorsal margin of lateral area appearing dentate.

Material examined. Five specimens: "Upper Campground," Pinery Canyon, elev. 7000 ft, Chiricahua Mountains, Cochise Co., Arizona. Reared August–December 1967 on dead oak leaves (*Quercus* spp.) by G. L. Godfrey. Reared from eggs of associated female moth determined by J. G. Franclemont.

Remarks. The generic description for the larva of *Phalaenophana* that Crumb (1934) proposed is based on *P. pyramusalis*. Although his description is quite detailed, he emphasized two sets of characters; namely, the positions of the head setae P1 and P2 relative to each other, seta L, and the epicranial suture and the nature of the subanal setae, to separate *Phalaenophana* from many other herminiine genera. The conditions in *P. pyramusalis* are P1–P1 slightly less than P2–P2 and P1 distinctly closer to the epicranial suture than to L; the subanal setae are approximate and form an anal fork (Fig. 11). The only slight modification of the cephalic chaetotaxy in *P. extremalis* is that P1–P1 and P2–P2 may attain subequality. The structure of the latter species' subanal setae (Fig. 10) deviates strikingly from the generic description. The setae are widely spaced and too small to be called an anal fork.

The hypopharyngeal complexes of the two species are similar, the only difference being that the spinneret of *P. extremalis* is slightly longer than that of *P. pyramusalis*.



FIGS. 7-11. *Phalaenophana extremalis*: 7, posterior view of tarsal setae; 8, setae D1-2 on Ab7; 9, setae D1-2 and SD1 on Ab9; 10, ventral view of Ab10 showing subanal setae. *P. pyramusalis*: 11, ventral view of Ab10 showing subanal setae. Scale lines = 0.5 mm except as noted.

The inner mandibular surface of *P. extremalis* lacks any suggestion of an inner tooth on the first inner ridge. A tooth is present in *P. pyramusalis*, albeit small. Series of newly moulted and older *P. extremalis* ultimate instar larvae need to be examined and compared to determine if the absence of the inner tooth is a specific characteristic or whether the absence is the result of mandibular wear.

The nature of the SD and L setae on T1 may be a useful generic character that was not considered by Crumb except in reference to the extent of which the cervical shield includes the SD setal bases. On the mature larva of *P. extremalis*, SD1 and L2 of T1 occur only as vestigial setigerous tubercles; the actual setae are absent (Fig. 5). These tubercles and setae are present on T1 in *P. pyramusalis*. As a side note, both SD1 and L2 prothoracic tubercles and setae are absent in the herminiine genus *Renia* (Godfrey, 1980).

I have some reservations about whether *P. extremalis* and *P. pyramusalis* are in fact congeneric, based on the differences of the subanal setae and SD1 and L2 on the prothoracic segment of the two species. However, I am hesitant to suggest with which genus *extremalis* might be more naturally grouped, because my knowledge of the larval Herminiinae as a whole is yet limited. It becomes increasingly apparent that the generic limits of the herminiines need to be redefined following an overall assessment of new characters and reconsideration of old ones.

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